

## FOUR NEW SPECIES OF EUCALYPTUS

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### Summary

Three new species of *Eucalyptus* from Queensland, *E. brassiana*, *E. henryi* and *E. melanoleuca*, and one from Malesia, *E. urophylla*, are described and their relationships and distribution discussed.

***Eucalyptus brassiana*** S. T. Blake, sp. nov. affinis *E. tereticorni* sed cortice trunci plus persistenti, alabastris majoribus, fructu majore disco angustiore differt. **Typus:** Blake 20194.

**Arbor** 15-20 m alta, corona sparsa et ramulis  $\pm$  pendulis praedita. **Cortex** dimorphus in trunco (saltem sub medio) persistens cinereus sulcatus vel rimosus usque ad 1.2 cm crassus, alibi griseus vel caesius vel cremeus, laevis in schedis taeniformibus tenuibus decorticans. **Ramuli** tenues, angulati juvenes compressi. **Folia** alterna raro subopposita petiolis tortis 1.2-2.2 cm longis anguste lanceolata  $\pm$  falcata gradatim acuta, ad basam saepe obliquam angustata, subtus primo pallidiora tantem concoloria vel fere concoloria, crebre punctata, plerumque 10-17 cm longa 1-2.8 cm lata, pro more 7-15-ies longiora quam lata; costa supra leviter impressa subtus prominens, nervi tenues haud conspicui, laterales primarii utrinsecus costam 25-30 sub angulo 30°-50° abeuntes nervus intra marginalis a margine 0.7-2 mm distans reticulationes obscurae. **Umbellae** in axillis superioribus sitae saepe etiam speciminibus terminales, singulae, pedunculis 1-2 cm longis, 4-7 floriae; pedicelli 5-10 mm longi, graciles, sursum sub fructu incrassati. **Alabastra** angustius ovoidea  $\pm$  acuta vel acuminata, 14-17 mm longa, 6-7 mm lata, tenuiter rugulosa; tubus calycis late cyathiformis, parte superiore libra operculum conicum, acutum atque leviter acuminatum vel leviter curvum, tubo equilaterum et 3-3.5-ies longius. **Stamina** ca 1 cm longa, omnia fertilia; antherae versatiles, obovato-oblongae, cellulis parallelis in rimis longitudinalibus dehiscentibus; glans magna dorsalis. **Ovarium** semisuperum, pars superior a tubo calycis distans; breviter cylindricus apice late conicum; discus tenuis partem ovarii cylindricum tegens. **Fructus** ambitu latissime ellipticus vel circularis, circa 10-13 mm longus 9-11 mm latus; tubus cyathiformis calyci dimidiam longitudinem formans, fere laevis, margine angustus planusque; discus tenuis, vittaeformis, altus, capsulae adpressus; capsula semiexserta; valvae 4-5 omnes exsertae, subdeltoideae, incurvae, dimidiam partem exsertam capsulae adaequantur interdum style cuspidatae. **Plantulae** glabrae, caule acutissime tetraquetra  $\pm$  alato; folia juvenilia 5-8 jugata in petiolis brevibus angustatae discoloria, anguste elliptica vel anguste elliptica ovata usque angustissime ovata 3-7-ies longiora quam latiora  $\pm$  obtusa; folia intermedia (e surculis orta) alterna, petiolata, ovata, usque 15 cm longa et 7.3 cm lata, duplo longiora quam lata.

**Trees** 15-20 m tall, crown sparse and branchlets pendulous. **Bark** with two forms, on the trunk persistent up to about the middle, ash grey, furrowed or with numerous fissures, to 1.2 cm thick, elsewhere grey, lavender-blue or cream, smooth, decorticating in thin ribbon-like sheets. **Branchlets** thin, angular, flattened when young. **Leaves** alternate rarely sub-opposite with twisted petioles 1.2-2.2 cm long, narrowly lanceolate  $\pm$  falcate gradually acute, often obliquely narrowed at the base, at first paler below becoming concolorous or nearly so,

\* Died 24 February 1973.

closely punctate, mostly 10–17 cm long, 1–2.8 cm wide, commonly 7–15 times longer than wide; midvein slightly impressed above prominent below, fine veins inconspicuous, with 25–35 primary veins on each side subtending at between 30°–50°; intermarginal vein 0.7–2 mm from the margin; reticulations obscure. **Umbels** solitary in the upper axils and also terminal in some specimens, with peduncles 1–2 cm long; 4–7 flowers on slender pedicels 5–10 mm long not thickened below the fruit. **Flower buds** narrow ovoid  $\pm$  acute or acuminate, 14–17 mm long, 6–7 mm wide, somewhat finely wrinkled; calyx tube broadly cyathiform, superior part free; operculum conical, acute and slightly acuminate or curved, as wide as the tube and 3–3.5 times longer. **Stamens** ca 1 cm long, all fertile, anthers versatile obovate-oblong, cells parallel dehiscing by longitudinal slits, glands large and dorsal. **Ovary** semisuperior, the superior part separated from the calyx tube, shortly cylindrical, broadly conical at the apex; narrow disc partly concealing the cylindrical part of ovary. **Fruit** very broadly elliptical or circular in outline about 10–13 mm long, 9–11 mm wide, calyx cyathiform the tube making up half the length, nearly smooth, margin narrow and flat; disc thin, bandlike, raised, adpressed to the capsule; capsule semi-exsert; valves 4–5 all exsert subdeltoïd, incurved, included and exserted parts of capsule about equal, sometimes with pointed style. **Seedling** glabrous; stem very acutely tetraquetrous  $\pm$  winged; juvenile leaves 5–8 in pairs tapered into short petioles, discolorous, narrowly elliptical or narrowly elliptic-ovate to most narrowly ovate, 3–7 times longer than wide  $\pm$  obtuse; intermediate leaves (and reversion growth) alternate, petiolate, ovate, to 15 cm long and 7.3 cm wide, twice as long as wide.

**Type:** Cooktown, 28 Jan 1958, *S. T. Blake* 20194 (BRI, holo; NSW, FRI, K, iso).

**NEW GUINEA:** *West New Guinea:* Along track to Keliki, Aug 1941, *Anta* 245. **Papua:** Wassi Kussa R., Feb 1890, *McGregor*; Tarara, Wassi Kussa R., Dec 1936, *Brass* 8402; Tarara, Jan 1937, *Brass* 8719; Daru I., Apr 1936, *Brass* 6428, Dec 1950, *Jackson* NGF 2748; Feb 1953, *Hart* NGF 5022A; Dagwa, Oriomo R., Mar 1934, *Brass* 5947, 6004, 6005, Dec 1950, *Jackson* NGF 2729, Mar 1953, *Hart* NGF 5022; Wuroi, Oriomo R., Mar 1934, *Brass* 6020; 8°50'S 143°15'E, Jan 1959, *Gray & White* NGF 10435. **Queensland:** Cook District: Weipa, Jul 1962, *Baxter* 2441; Wenlock, 13°06'S 142°57'E, Jul 1968, *Pedley* 2763; McIlwrath Range, Silver Plains Stn, Aug 1966, *Volck*; near Finch Bay, Cooktown, Jun 1968, *McKern*; Bloomfield R., *Petrie*; Lankelly Ck, 8 miles NE Coen, Oct 1969, *Webb & Tracey* 8357; between Portland Roads and Iron Range, Oct 1968, *Webb & Tracey* 8356.

This species is found on river levees outside riverain forest often in pure stands or in "savannah" forests usually associated with other species of the genus.

*E. brassiana* resembles *E. tereticornis* Sm. more closely than any other in its foliage, long operculum, partly superior ovary and capsule, the lower part of the free portion covered by the disc, the claw-like incurved valves and seeds, but the trunk has much greater development of persistent thick bark, the leaves show a tendency to be discolorous, the buds and fruit are larger and the disc in the fruit is thinner, not domed and does not extend over the rim of the calyx tube. The fruits resemble those of *E. exserta* F. Muell, of eastern Queensland but this species usually has much smaller buds and fruits with a relatively shorter operculum, less of the disc on the free portion of the ovary and the valves of the capsule  $\pm$  excurved at the base before incurving upwards so that the outline of the fruit is not circular, very narrow intermediate leaves and brown rather than red wood. The rough persistent bark often extends into the crown of the larger trees but  $\pm$  shrubby states are known with a comparatively small amount of persistent bark.

*E. brassiana* differs from both *E. tereticornis* and *E. exserta* in the tendency to flower only in the upper axils; frequently with an umbel apparently terminating the twigs so that the flowers appear to be on the crown rather than within it.



Figure 1. *Eucalyptus brassiana* S. T. Blake. Drawing supplied by the Director, Division of Botany, Department of Forests, Lae, Papua New Guinea.

**Eucalyptus henryi** S. T. Blake, species nova affinis *E. maculatae* Hook. et *E. citriodora* Hook., sed alabastris unicostatis, operculo calycis tubo aequilato subaequilongo rugosulo, foliis intermediis multo majoribus glabris rarissime peltatis praecipue differt. **Typus:** *Blake* 19889.

**Arbor** magna trunco lacunis crebris impressa, cortice laevi deciduo  $\pm$  maculato obtecta; ramuli acute angulati  $\pm$  tetraquetri. **Folia juvenilia** circa 10, omnia alterna, longe petiolata, sparsim setosa, ovata 1–2 supra interdum peltata, discoloria, venorum lateralium paribus 4 vel pluribus praedita. **Folia intermedia** alterna, breviuscule petiolata, ut plurimum 1–2 infima peltata, vel oblonga vel ovata vel ovato-lanceolata,  $\pm$  caudato-acuminata, glaberrima, viridia, plurivenosa, rigida, usque ad 30 cm longa et 15 cm lata, superiora  $\pm$  concoloria. **Folia adulta** alterna, petiolata, glaberrima, minime discoloria; petioli robusti 1–2.5 cm longi; laminae lanceolatae, longe acuminatae leviter falcatae vel fere rectae, 16–28 cm longae, 2.7–4.5 cm latae, 5–7-ies longae quam latae, venis utrinsecus costam 45–55 ex angulo 35°–50° progredientibus rectis sursum leviter incurvis vel subflexuosis in nervem intramarginalem 0.5–0.9 mm a margine distantem concurrentibus. **Flores** in paniculis umbellarum 3-florarum axillaribus vel lateralibus dispositi, ramis ramulisque brevibus crassique; pedicelli 3–4 mm longi,  $\pm$  3 mm crassi. **Alabastris** ellipsoideo-obovoidei acuminati, 1-cotati, punctulati, circa 12–13 mm longi, 7–8 mm lati; operculum duplex, late subconicum breviter acuminatum, rugulosum, nitidulum, circumcissum, calycis tubum  $\pm$  adaequans et eo aequilatum. **Stamina** omnia fertilia, exteriora circa 15 mm longa; antherae versatiles, obovato-oblongae, cellulis parallelis per totam longitudinem rima dehiscentibus, glandula dorsali magna praeditae. **Fructus** suburceolati lignosi, verrucosi (an semper?) breviter pedicelati, circa 2 cm longi et 1.6 cm lati, ore 0.8 mm crassi; capsula profunde inclusa 3-valvis. **Semina** fertilia irregulariter ovata, compressa, nec marginata nec alata.

**Large tree** with many depressions on trunk, bark smooth, deciduous  $\pm$  maculate; branchlets acutely angled  $\pm$  square. **Juvenile leaves** about 10 all alternate, with long petioles, sparsely setose, ovate, 1–2 upper ones sometimes peltate, discolorous, having 4 or more equal lateral veins. **Intermediate leaves** alternate; somewhat petiolate, at the most the lowest 1–2 peltate, oblong, ovate or ovate lanceolate  $\pm$  caudate-acuminate, glabrous, green, many veined, rigid to 30 cm long and 15 cm wide, upper ones  $\pm$  concolorous. **Adult leaves** alternate, petiolate, glabrous, very rarely discolorous; petiole robust 1–2.5 cm long; lamina lanceolate acuminate, slightly falcate or almost straight, 16–28 cm long, 2.7–4.5 cm wide 5–7 times long as wide, veins 45–55 on each side of the midvein at an angle of 35–50°, straight, below slightly incurved or subflexuose concurrent with the intramarginal vein at a distance of 0.5–0.9 mm from the margin. **Flowers** in panicle of 3-flowered umbels, axillary or laterally arranged, branches and branchlets short and thick; pedicels 3–4 mm long  $\pm$  3 mm thick. **Flower buds** ellipsoid-obovoid, acuminate, single ribbed, punctulate, about 12–13 mm long, 7–8 mm wide; operculum double, broadly subconical, shortly acuminate, rugulose, shiny, circumciss, the calyx tube  $\pm$  equal to it and equally wide. **Stamens** all fertile, outside ones about 15 mm long; anthers versatile, obovate-oblong, cells parallel dihiscent by splitting the total length, each with a large dorsal gland. **Fruit** suburceolate, woody, verrucose, shortly pedicellate about 2 cm long and 1.6 cm wide, rim 0.8 mm thick; capsule with three valves deeply included. **Fertile seed** irregularly ovate, compressed without margins or wings.

**Type:** Stafford near Brisbane, 8 Jan 1956, *S. T. Blake* 19889 (BRI, holo; NSW, FRI, CANB, K, iso)

**Queensland.** Moreton District: Parish of Bunya, *Massie* 17; Stafford, in 1953, *Blake* 19233; near Gold Creek, Feb 1956, *Stevens*; near Goodna, Aug 1942, *Richards* (hb. Forestry School, Canberra), in 1953, *Henry*; Mt Gravatt, Aug 1926, *White* 926; Kuraby, Jan 1922, *White*; Brisbane, cultivated seedlings, Mar 1954, *Blake* 19252.

All the localities are within or close to the boundary of the City of Greater Brisbane, but I have seen from the train trees of what appears to be the same species southward from Brisbane almost to Grafton, New South Wales. It is a constituent of *Eucalyptus* forest on stony or shallow soil and has been regarded as a broad-leaved form of *E. maculata* Hook., a species widely spread in SE Queensland in similar habitats. These two species resemble one another in bark, but the much larger leaves of *E. henryi* give to the crown a heavier and denser appearance. Herbarium specimens are coarser in every way. The operculum is almost or quite as long as the calyx-tube and about as wide as it instead of decidedly shorter and broader as in *E. maculata* while the whole bud bears a narrow rib or angle from pedicel to the tip of the operculum. Young plants of the new species are very different from those of *E. maculata* and *E. citriodora*. Seedlings of the latter two are strongly setose with leaves that are peltate except for the first few, the peltate setose leaves being rather numerous and found also on coppice growth and reversion shoots on mature trees. On seedlings of *E. henryi* peltate leaves are rare, the scanty bristles soon disappear, and the relatively enormous stiff intermediate leaves are very characteristic of older seedlings and coppice shoots; growth is also very slow compared with the others. In the adult leaves, the angle of divergence of the lateral veins is slightly wider in *E. henryi*. The latter is figured under *E. maculata* in Maiden, Crit. Rev. Eucalyptus 5: (1922) pl. 178, figs. 2a-c; the buds in 2b are immature.

*E. maculata* and *E. citriodora* resemble each other very closely, much more closely than either resembles *E. henryi*. On the whole, *E. citriodora* has somewhat narrower, rather more acute intermediate leaves, scarcely dimpled trunk, and somewhat smaller flowers with relatively slender pedicels as long or as longer than the calyx-tube. They were placed in the Corymbosae-Peltatae by Blakely, but with *E. henryi* they differ from the Corymbosae as defined by me in Aust. J. Bot. 1: 229-30 (1953) by the alternate juvenile leaves, the less regular lateral veins of the adult leaves at a more acute angle to the midrib, axillary (not terminal) panicles, few (not several) flowers in each umbel, and sharply circumsciss opercula. The usually complete absence of opposite leaves from the seedlings is noteworthy, but a single pair following the cotyledons is sometimes found; I have not been able to find 4-5 pairs in *E. citriodora* as described by Maiden, *op. cit.* 8: 184 (1933) and Blakely Key, Eucalyptus 93 (1934), nor the 5-6 pairs for *E. maculata* described by Blakely on p. 94. Maiden, *l.c.*, Col. Pl. 4-5, figs 29a, 30, 31, figured no opposite leaves on either species. From the examples seen, there is a tendency in *E. maculata* for the early juvenile leaves to be broader on seedlings raised from seed from southern New South Wales and Victoria than those seedlings from seed from northern New South Wales and Queensland.

My interest in *E. henryi* was roused by the field observations of Mr. N. Henry of the Queensland Department of Forestry. Thanks to him and other officers of this department, much more material of the group became available for the study, including nursery-raised seedlings of the three species. The fine series of seedlings preserved at the Australian Forestry School referred to above demonstrate the range of variability in *E. maculata*. *E. henryi* is also represented.

**Eucalyptus melanoleuca** S. T. Blake; species nova affinis *E. paniculatae* Sm., sed floribus fructibusque minoribus, operculo quam calycis tubo multo brevior, capsulae valvis profunde inclusis, foliis fere concoloribus juvenilibus angustioribus subsessilibus distinguenda. **Typus:** *Blake* 18975.

**Arbor** usque ad 30 m alta trunco ramisque majoribus cortice atro duro crasso aspero profunde sulcato obtectis, ramis minoribus ramulisque albidis laevibusque; ramuli primo angulosi mox subteretes. **Folia juvenilia** per paria circa 5 opposita, sessilia vel brevissime petiolata, lanceolata, discoloria, glabra, margine  $\pm$  crenulata circa 3.5–5 cm longa, 0.5–0.9 cm lata. **Folia intermedia** alterna, breviter petiolata, ovata, usque ad 10 cm longa et 4 cm lata. **Folia adulta** dissita, longe petiolata, leviter discoloria, glabra, marginibus interdum angustissime recurvis saepius  $\pm$  crenulata; petiolus tenuis 1.2–2.3 cm longus; lamina lanceolata, sensim acute acuminata,  $\pm$  falcata plerumque circa 8–15 cm longa, 1.5–2.5 cm lata, plerumque 4–7.5-ies longior quam lata, nervis lateralibus haud conspicuis 15–18 utrinsecus costam ex angulo 40–45° progredientibus, nervo intra-marginali 0.5–1.1 mm a margine distant. **Inflorescentia** paniculata terminalis vel interdum subterminalis, foliis multo brevior; umbellae plerumque 4–6-florae; pedicilli sub flore angulosi valde compressi, circa 2–5 mm longi, sub fructu minus compressi circa 2–3.5 mm longi. **Alabastri** subobovoidi in pedicellum sensim attenuati, 2–3-costati, circa 5–6 mm longi, circa 3–3.5 mm lati; operculum conicum acutum calycis tubo fere obconico subduplo brevius et eo angustius. **Stamina** usque 4 mm longa, exteriora plura ad filamenta subulata redacta; antherae subcuneatae, truncatae, ad apicem filamenti oblique affixae, apice poris dehiscentes, haud glanduligerae. **Fructus** truncato-obovoidi in pedicello attenuati,  $\pm$  2–3-costulati, rugulosi, circa 5–6 mm longa 4–5 mm lata, oris margine plani circa 0.7 mm crassi disco obscuro; valvae capsulae pro more 4 profunde inclusae. **Semina** fertilia nigerbrunnea polyhedra vel subovata, compressa, tenuissime reticulata vix striolata, 1–1.4 mm longa, 0.8–1.05 mm lata; semina sterilia multo minora pallidioraque, polymorpha, angulata.

**Tree** up to about 30 m tall with trunk and larger branches covered with black, persistent, thick, rough, deeply furrowed bark; smaller branches and branchlets white and smooth; branchlets at first angular soon subterete. **Juvenile foliage** for about 5 pairs opposite, sessile or very shortly petiolate lanceolate discolorous, glabrous, with margin  $\pm$  crenulate, about 3.5–5 cm long, 0.5–0.9 cm wide. **Intermediate foliage** alternate, shortly petiolate, ovate to 10 cm long and 4 cm wide. **Adult foliage** well spaced with long petioles, slightly discolorous, glabrous, margins sometimes very narrowly recurved often  $\pm$  crenulate; petioles thin, 1.2–2.3 cm long; lamina lanceolate, acuminate  $\pm$  falcate usually about 8–15 cm long, 1.5–2.5 cm wide, usually 4–7.5 times longer than wide, primary veins not conspicuous, 15–18 on each side of the midvein at an angle of 40–45°; intramarginal vein 0.5–1.1 mm in from the margin. **Inflorescence** paniculate terminal or sometimes subterminal, leaves much shorter, umbels usually 4–6 flowered; pedicels strongly compressed and angled below the flowers, about 2–5 mm long, less compressed below the fruit 2–3.5 mm long. **Flower buds** subobovoid gradually attenuated into the pedicel, 2–3 ribbed, about 5–6 mm long; about 3–3.5 mm wide; operculum conical, acute, calyx tube almost obconical, less than half as long and narrower than the operculum. **Stamens** up to 4 mm long, many outside filaments reduced to fine point; anthers subcuneate, truncate, attached obliquely to the top of the filament dehiscing by apical pore, without glands. Fruit truncate-obovoid on slender pedicels  $\pm$  2–3 ribbed, rugulose, about 5–6 mm long 4–5 mm wide margin flat about 0.7 mm thick, disc obscure; capsule usually with 4 valves deeply included. **Fertile seed** dark brown, many sided or sub-ovate, compressed, finely reticulate rarely with fine linear markings 1–1.4 mm long, 0.8–1.5 mm wide; sterile seeds much smaller and paler, variable in shape, angular.

**Type:** 6–7 miles N of Yarraman, Jul 1952, *Blake* 18975 (BRI, holo; CANB, NSW, FRI, K, iso)

**Queensland.** Burnett District: Nanango,  $\pm$  390 m, May 1940, *Blake* 14202. Moreton District: Cooyar Range, 6–7 miles N of Yarraman,  $\pm$  435 m, July 1952 *Blake* 18975; Yarraman, Sep 1924, *Cameron* Y45.

This ironbark belongs in Blakely's section *Terminales* and is most closely allied to *E. paniculata* Sm. from New South Wales from which it differs as given in the diagnosis above. The smooth white bark of the smaller branches is in strong contrast with the black deeply furrowed bark on the rest of the tree and this contrast with the dense dark green crown fairly readily distinguishes the species in the field. *E. decorticans* (F. M. Bail.) Maiden and *E. sideroxylon* A. Cunn. ex Maiden are other ironbarks in the area with smooth upper branches; the former has all or most of the branches white, *E. sideroxylon* has duller, less conspicuous smooth branches, while both have much larger buds and fruits and narrow juvenile and intermediate leaves. Most of the leaves of *E. melanoleuca* have somewhat undulate to distinctly crenulate margins, but some of the crenulations are the result of insect damage; if this margin is a regular feature of undamaged leaves, it will provide a useful diagnostic character.

A few stands of the species are to be found near Yarraman and, according to Cameron, it is found in rain-forest margins. It is also associated with other species of *Eucalyptus* in open forest.

The species epithet refers to the strongly contrasted black and white bark.

**Eucalyptus urophylla** S. T. Blake, species nova affinis *E. albae* Reinw. ex Blume sed cortici persistenti aspero rimoso squamoso-fibroso et foliis dorsiventralibus valde discoloribus supra sine stomatibus differt. **Typus:** *Turnbull* 210 (FRI, holotypus)

**Arbor** altitudinem fere 50 m altigenis trunco  $\pm$  excurrente. **Cortex** saltem in trunco saepissime persistens asper rimosus squamoso-fibrosus, badius vel griseus in ramulis saepe etiam in rami raro etiam in parte trunco deciduis, laevis griseus in lamellis longis decorticans. **Ramuli** angulati. **Folia** dissita dorsiventralia valde discoloria longe petiolata; petioli supra sulcati pro more 1.2–3 cm longis et pro more  $\frac{2}{3}$ – $\frac{3}{4}$  laminae latitudinis aequantes; laminae rectae vel leviter falcatae vulgo anguste utique angustissime ovatae interdum ovatae, caudato-acuminatae, basi cuneatae interdum obliquae, aetate  $\pm$  coriaceae, maginibus leviter incrassatis leviter recurvis, supra saturate virides nitides sine stomatibus, infra multo pallidae opacae, untrique dense punctulatae; pro more 7–20 cm longae acumine longo incluso 0.7–3 cm latae, sine acumine circa (2)–3–6–plo longiores quam latiores; vena intra marginalis tenuis a margine circa 0.6–1 mm distans; nervi lateribus primariis tenuibus fere rectis plerumque subparallelis utrisectus costae 16–18 sub angulis plerumque 45°–65° abeuntibus. **Umbella** in axillis superiores situs, solitaria, 5–8 floribus; pedunculus rectus vel fere rectus, compressus  $\pm$  ancipitiis, basem versus  $\pm$  tenuem sursum dilatatus, 8–22 mm longus; pedicelli angulati  $\pm$  compressi sub fructibus vix mutati, 4–10 mm longi. **Alabastra** ellipsoidea vel admodum obovoidea breviter acuminata vel apiculata vel rotundata teretia in pedicellos abrupte discinentes, 10–14 mm longa, 6–10 mm lata, saepe conspicue punctata; calycis tubus  $\pm$  cyathiformis supra ovarium valde productum equans longus et latus vel sapius paullo brevior quam latus; operculum calycis tubum subaequilongum vel paullo longius, et distincte latius. **Stamina** omnia fertilia exteriores 6–8 mm longa: anthera versatiles obovato-oblongae cellulis parallelis in rimis longitudinalibus omnino dehiscentibus; glans magna ellipsoidea dorsalis. Ovarium omnino inferum apice leviter convexo. **Fructus** a pedicello bene distincto, cyathiformis  $\pm$  obconicus aequae longus et latus vel paulo brevior quam lator, valvis exclusis 6–10 mm longus 7–12 mm latus, saltem supra medium pro more ecostatis fere laevis, pariete externo saepius subtenui et margine acuto, raro margine usque lato interne descendente disco inconspicuo; operculi cicatrix leviter depressa usque 2 mm lata; capsula 3–4 loculata; valvae  $\pm$  inclusa vel partem exserta. **Semina** fertilia ambitu irregulariter 4–6 angulati vel  $\pm$  semicirculari, turgida vel irregulariter compressa, marginibus alarum  $\pm$  rotundatis, alais acutis margine obscure denticulato, faciebus tenuiter striatis et trabeculatis  $\pm$  1.1–1.5 mm longo 0.8–1 mm lato; hilum parvum subbasale. **Plantulae** glabrae; lignotuber pravum vel 0; cotyledons circa duplo latiores quam longiores fere and medium bilobae; folia in paria circa 6–7 disposita, anguste elliptica-oblonga vel elliptica usque anguste ovata obtusa, cuneata conspicuo petiolata, discoloria. **Folia juvenilia** glabra, subopposita, ovata vel admodum elliptica, acuta interdum apiculata vel brevissime acuminate circa 6.5  $\times$  3.5 – 15  $\times$  5.5 cm.

**Tree** attaining height of about 50 m, trunk more or less excurrent. **Bark** at least on the trunk usually persistent, rough, fissured, scaly-fibrous, reddish brown or pearl grey; deciduous on the small branches and rarely on part of the trunk; smooth, grey decorticating in long strips. **Stems** angular. **Leaves** dorsiventral and well spaced, markedly discolorous and with long petioles. **Petioles** grooved above, usually 1.2–3 cm long and usually  $\frac{2}{3}$ – $\frac{3}{4}$  of the width of the leaf. **Lamina** straight or slightly falcate, commonly narrow or very narrowly ovate, sometimes ovate, caudate acuminate, cuneate at the base sometimes oblique, coriaceous when mature with slightly thickened and recurved margins, shining deep green and without stomates above, markedly duller and paler below, densely punctate on both sides, usually 7–20 cm long including tapering point 0.7–3 cm long, 0.7–3 cm wide; without the point about (2)–3–6 times longer than wide with a fine intramarginal vein about 0.6–1 mm from leaf margin and 16–28 fine almost straight and parallel primary lateral veins on each side of the midrib usually making an angle of about 45°–65°. **Inflorescence** a single umbel with 5–8 flowers above the axil on a straight or nearly straight, compressed  $\pm$  two angled peduncle 8–22 mm long usually slender at the base and broadened upwards. **Pedicels** angular,  $\pm$  compressed 4–10 mm long, nearly uniform below fruit. **Flower buds** ellipsoid or fully obovoid, shortly acuminate, apiculate or rotund, terete, abruptly contracted into the pedicel, 10–14 mm long, 6–10 mm wide, often conspicuously punctate. **Calyx tube**  $\pm$  cyathiform, strongly elongated above the ovary, uniformly as long as wide or more often a little shorter than wide. **Operculum** about equal or slightly longer than the calyx tube and distinctly wider than it. **Stamens** 6–8 mm long, all the outer ones fertile; anthers versatile, obovate to oblong; cells parallel with longitudinal grooves, all dehiscent; glands large, ellipsoid, dorsal. **Ovary** always inferior, apex slightly convex. **Fruit** easily distinguished from pedicel, cyathiform or  $\pm$  obconic as long as wide or a little shorter than wide excluding the valves, 6–10 mm long, 7–12 mm wide, always without ribs above the middle, nearly smooth, mostly with relatively thin walls and a thin acute or rarely wide rim depressed inwards; disc inconspicuous; operculum scar slightly depressed all round, 2 mm wide; capsule 3–4 loculi; valves  $\pm$  included or partly exerted. **Fertile seeds** irregular in outline, 4–6 angulate or  $\pm$  semicircular, turgid or irregularly compressed, margins of the wing  $\pm$  round; wings acute with the margins  $\pm$  obscurely denticulate faces finely striated and cross hatched 1.1–1.45 mm long, 0.8–1 mm wide; hilum small, subbasal. **Seedling** glabrous; lignotuber small or none; cotyledons about twice as wide as long, usually bilobed about the centre; leaves arranged in pairs for about 6–7, narrowly elliptically oblong or elliptical to narrowly ovata, obtuse, cuneate, conspicuously petiolate, discolorous. **Juvenile foliage** glabrous, subopposite, ovate or fully elliptical, acute, sometimes apiculate or very shortly acuminate about (6.5  $\times$  3.5)–(15  $\times$  5.5) cm.

**Type:** Timor: 20.8 km S of Dili on road to Maubisse, 8°38'S 125°37'E, Aug 1971, *Turnbull* 210 (FRI, holotype).

**Habitat:** On the mountains usually above 500 m of the Indonesian Islands of Timor, Wetar, Flores, Lamblem and Alar. Seed has been distributed under the names of *Eucalyptus 'decaisneana'* and *Eucalyptus 'alba'* for cultivation mainly as a timber source to many parts of the tropical world.

**Timor:** Bioba,  $\pm$  1400 m, Mar 1939, *Bloembergen* 33; Eban,  $\pm$  800 m, Mar 1924, *Therik* 15; Koeamoea,  $\pm$  800 m, Mar 1924, *Fangidoe* 3; 5 km W of Eban, N of Soe, 1230 m, Aug 1968, *Larsen* 32; Moetis Ra., Fatoe Emnasi Forest Reserve,  $\pm$  1400 m, Apr 1937, *de Grijp* (4 sheets); Fatoe Emnasi,  $\pm$  1500 m, Feb 1938, *Mas Nasiran* 7; Kipeana  $\pm$  1300 m, Mar 1939, *Bloembergen* 37, 37a; Mar 1939, *Bloembergen* 38, 38a, 38b, 39; Bisila 1200 m, Sep 1933, *Damanoe* 25; Hole Kenoetoe,  $\pm$  1000 m, Mar 1939, *Bloembergen* 40; Saoc, 1020 m, Feb 1927, *Toengga*; ca 10 km from Ermera towards Bobenaro, 1140 m,



Jul 1963, *Larsen*; ca 35 km from Dili towards Ermera, 540 m, Aug 1968, *Larsen* 39; near Dili, 480 m, July 1963, *Jacobs* T11, 12 km from Dili towards Maubisse, 600 m, Jul 1968, *Larsen* 11 and 18; 14 km from Dili towards Maubisse, 720 m, Jul 1968, *Larsen* 14; 21 km from Dili towards Maubisse, 960 m, Jul 1968, *Larsen* 15; 25 km from Dili towards Maubisse, 1140 m, Jul 1968, *Larsen* 16; 26 km from Dili towards Maubisse, 1140 m, Jul 1968, *Larsen* 17; 28 km from Dili towards Maubisse, 960 m, Jul 1968, *Larsen* 2; ca 35–40 km from Dili towards Maubisse, 1200 m, Jul 1968, *Larsen* 4; S of Dili near Aileu, 900 m, Jul 1963, *Jacobs* T9; near Aileu, 660 m, Jul 1963, *Jacobs* T10; between Aileu and Maubisse, 1200 m, Jul 1963, *Jacobs* T14; near (N of) Maubisse, 1200 m, July 1963, *Jacobs* T8; Maubisse on road to Turisca, 1410 m, Jul 1968, *Larsen* 7; divide between Maubisse Turisca, N facing slope, 1500 m, Jul 1963, *Jacobs* T2; Turisca, 1530 m, Jul 1963, *Jacobs* T1; near (SW of) Maubisse, 1800 m, Jul 1963, *Jacobs* T6; near Hato, about SW of Maubisse towards Ainaro 2100 m, Jul 1963, *Jacobs* T5; Mt Tatamailu, ca 2400 m, Jan 1954, *van Steenis* 18434, 18435; Mt Tatamailu, 2600 m, Jan 1954, *van Steenis* 18436; Mt Tatamailu, 2800 m, Jan 1954, *van Steenis* 18410, 18430, 18488; Mt Tatamailu, ca 2900 m, Jan 1954, *van Steenis* 18455; Mt Tatamailu, summit 2950 m, Jan 1954, *van Steenis* 18462; above halfway between Maubisse and Betano 1380 m, Jul 1963, *Jacobs* T4; Mt Mundo Perdido, ascent from Ossu 700–1000 m, Dec 1953, *van Steenis* 18242. **Wetar.** Laroe Leng Forest, 1000 m, Jul 1924, *Sastrodihardjo* 13, 14; Kali M. Lerai, N of Ilwaki 900 m, Apr 1939, *Bloembergen* 110 and 112. **Flores.** Mt Lewu Tobi, Hokeng, 420 m, Jul 1968, *Larsen* 30; Maumere, Egon Mtns, 600 m, Sep 1936, *de Voigd* 2804, 2805; Oct 1936, *de Voigd* 1 and 2; Mt Egon,  $\pm$  1703 m, Jun 1923, *Sastrodihardjo* 8; Leiwowerang,  $\pm$  700 m, Feb 1927, *Djawa* 123; Mt Larantoeha, *Teijsmann* H.B. 7952. **Lomblem.** Leivo Lera,  $\pm$  600 m, Jun 1924, *Sastrodihardjo* 4; Leve Wehe;  $\pm$  940 m, Jun 1924, *Sastrodihardjo* 5. **Alor.** Kaka,  $\pm$  500 m, Aug 1924, *Sastrodihardjo* 32; Pido, 1350 m, Jul 1924, *Sastrodihardjo* 27; Sigeker, 1100 m, Feb 1922, *Sastrodihardjo* 25; Bare, 960 m, Aug 1924, *Sastrodihardjo* 30.

*Cultivated Plants.* **Malaya:** Cameron Highlands, 1410 m, June 1953, *Tapah* in *Kepong* FN 69452. **Sumatra:** Tapiannoelli, 10 km N of Siborong, 1100 m, Sep 1931, *Huitema* 133. **Bogor:** Garoet, Leuviliang, Jan 1939, *Kartaatmadja* Ja 4681. **Celebes:** Makassar, *Nasiran*. **Flores:** 34 km E of Ende, 660 m, Jul 1968, *Larsen* 28.

*E. urophylla* differs from *E. alba* Reinw. ex Bl. in that the trees are mostly straight with a  $\pm$  excurrent trunk, brown fissile wood, rough persistent bark, more angular twigs with shorter internodes, narrow caudate acuminate often  $\pm$  falcate discolorous leaves with stomata restricted to the lower surface, shorter petioles, smaller  $\pm$  elliptic coppice leaves and on the whole a thinner, sharper rim to the fruit and more deeply inserted valves.

In the middle part of its altitudinal range on Timor, the rough bark tends to extend well into the crown with only the smaller twigs having smooth deciduous bark. In the upper altitudes about 2000 m and upwards there seems to be a strong tendency for the smooth bark to extend to the larger branches and even to the trunk itself. These "half barked" trees as they would be somewhat fancifully called in Australia are also found where the two species meet and sometimes as strays well below the usual lower limits of the range—in other words in more extreme habitats. These trees have acquired distinctive local names and have been presumed that they are hybrids between the two species. Hybrids undoubtedly occur and at least some of them are intermediate in growth form and timber as well as having leaves  $\pm$  intermediate in form, faintly discolorous, stomata on both surfaces but definitely fewer on the upper surface. *Bloembergen* 38 (bb 27094–5) from a "half barked" tree has leaves, buds, flowers and fruit much more like the general run of *E. urophylla* (and with stomata restricted to the lower surface of the leaf) than his 37–37a (bb 27092; 27093) without fruit from an entirely rough barked tree which has unusually narrow leaves and unusually small buds and flowers. His 31 (bb 27084) from another "half barked" tree with leaves with about  $\frac{1}{4}$  of the stomata on the upper surface and surely represents a hybrid.

On Flores it appears that there is a strong tendency for the smooth bark to extend over the whole tree.